



**WHAT IS CLAIMED IS:**

- 1 A method for improving load and/or displacement controlled tools and systems for modeling and simulation for semiconductor devices comprising:  
  
modification of the indenter blank;  
  
improving the process to add different probe needles; and  
  
controlling the method of the applied force or displacement.**
- 2 The method according to claim 1 wherein the indenter blank comprises an orifice to accept a probe needle.**
- 3 The method according to claim 1 wherein the indenter blank has a flat to allow bonding of a probe needle.**
- 4 The method according to claim 1 wherein the probe needle is securely attached to the blank.**
- 5 The method according to claim 1 wherein the indenter blank is two or more parts.**
- 6 The method according to claim 1 wherein the indenter blank allows more than one type probe geometry.**
- 7 The method according to claim 1 wherein the indenter blank design allows adjustment of the probe length.**

- 8      The method according to claim 1 wherein the indenter blank is designed such that the centerline of the needle is not in the centerline of the indenter blank.**
- 9      The method according to claim 1 wherein the force applied by the probe is not in the centerline of the indenter blank.**
- 10     The method according to claim 1 wherein the force and displacement applied is not normal to the centerline.**
- 11     A method for improved real time process control, device and package designs, enhance semiconductor support systems and better device reliability comprising;**

using load and/or displacement controlled tools and features;  
capturing data for modeling and simulation; and  
implementing change based on the results.

**12** The method according to claim 11 is to use an in-line load and/or displacement controlled tool with indenter blanks and probe needles to gather real-time electrical, mechanical and/or electromechanical data.

**13** The method according to claim 11 where the tool is used to simulate electrical probing, mechanical stresses and/or environment factors on one or more target specimens.

**14** The method according to claim 11 where the tool generates surface morphology data.

**15** The method according to claim 11 where the tool is used to verify the strength of the probe needle.

**16** The method according to claim 11 where the tool is used to review probe material to target material interactions.

**17** The method according to claim 11 where the tool is used to capture optical images of the probe or target for evaluation and improvement.

**18** The method according to claim 11 where the tool is used to analyze the deformation or fracture of a target site.

**19** The method according to claim 11 where the results are used to analyze the surface and subsurface layers to suggest improvement.

**20** The method according to claim 11 where the tool can be used in-line to provide real time feedback to process owners.